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Division of Mycology and Disease Survey

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BUREAU OF PLANT INDUSTRY

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THE PLANT DISEASE REPORTER

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THE PLANT DISEASE SURVEY

DIVISION OF MYCOLOGY AND DISEASE SURVEY

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February weather, page 88.

INCIDENCE AND IMPORTANCE OF QUINCE RUST ON APPLE AS AFFECTED BY ENVIRONMENTAL AND DEVELOPMENTAL FACTORS

Paul R. Miller

In 1932, during a survey made in the apple growing regions of Maryland, Virginia, West Virginia, North Carolina, and Georgia, and one county in Pennsylvania, for the purpose of obtaining information on susceptibility of apple varieties to rust, quince rust (caused by Gymnosporangium clavipes) was observed to be limited in distribution as compared with apple rust (caused by G. juniperi-virginianae), it being found only in Maryland, Virginia, and West Virginia1/. Since this was the first record of the occurrence of quince rust on apple in these States the general limit of its extent was determined (Fig. 1). In 1934 and again in 1936 this same region was resurveyed and the extent of the infected areas determined for each year.

In 1938 Dr. S. A. Wingard and the writer observed an orchard near Blacksburg, Virginia, in which nine varieties of apples were conspicuously infected with quince rust. This location was outside the area of previous records. The owner of the orchard, who is an experienced observer, believed this to be the first occurrence of quince rust there.

The results of the four years' observations are presented graphically in Figure 1 2/. On the basis of these observations alone, it might be assumed that there has been a gradual and definite extension of range of this fungus. However, that probably is not the case. Gymnosporangium clavipes has been known to occur in this area on other members of the rose family and on Juniperus spp. for a long time. Once established on the juniper it is perennial and may sporulate over a period of twenty years, and perhaps much longer. The disease on apple is limited to the fruits, which are susceptible only during a period of about twelve days, while they are small. The dissemination period for basidiospores of G. clavipes has been found to be relatively short as compared with those of G. juniperi-virginianae and G. globosum, both gall-forming types. Unless the susceptible stage of development of apple fruits coincides with the period of basidiospore dissemination there will be no infection. Many conditions, some of which are listed, can prevent their coincidence. In order that apples may become

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1/. Miller, Paul R. Apple rust survey. U. S. Dept. Agr. Bur. Plant Indus. Plant Disease Reptr. 16: 158-162. 1932.

2/. It should be mentioned that some additional locations for quince rust have been found by the writer in Pennsylvania, Virginia, and West Virginia, outside of the area discussed in this note.

——— Limit of extent as observed in 1932.
- - - Limit of extent as observed in 1934.
····· Limit of extent as observed in 1936.
× New location found in 1938.

Figure 1. Map showing extent of quince rust on apple in one apple-growing region as observed during four seasons. It was found only in a limited area of Virginia, West Virginia, and Maryland in 1932. In 1934 it was found northward into Pennsylvania and southward as far as Bedford, Virginia. In 1936 it was observed in the same areas as in 1934, and in addition, at two different points, west of Romney, West Virginia, and south toward Roanoke, Virginia. In 1938 it was found for the first time in an orchard near Blacksburg, Virginia, as indicated by "x".

infected they must be in the proper stage of development at the time the mature spores are available, and this short interval of time must coincide with a rainy period to bring about sporehorn gelatinization and subsequent

spore dissemination. Infection will not occur if the apples set so early that they reach the resistant stage before the spores are mature; if the season is late and all of the spores are disseminated before the fruits are formed; or if the fruits pass through the susceptible stage during a rainless period.

It seems likely that these fluctuating, limiting factors have not only influenced quince rust occurrence, but that they have also held this potentially devastating disease in check. When all conditions are favorable it comes into economic prominence, as is shown by three recent occurrences:

By random count, 40 percent of the fruits of Delicious and Winesap in a large commercial orchard in western Tennessee were severely damaged by quince rust3/.

In 1938 M. A. Smith4/, p. 13, said "In one orchard near Robertsville, Franklin County [Mo.] an entire crop of Red Delicious was destroyed by this rust [G. clavipes]."

In the same year John C. Dunegan5/, p. 36, reported from Arkansas "The fungus G. clavipes, attacking the Delicious varieties, appears to be increasingly prevalent. The fruit of the Red Delicious in one small orchard was so distorted in shape by this fungus that the prospects of a commercial crop were materially reduced."

(Division of Mycology and Disease Survey).

3/. Miller, Paul R. Fruit diseases in Tennessee. U. S. Dept. Agr. Bur. Plant Indus. Plant Disease Reptr. 19: 139. 1935.

4/. Smith, M. A. Notes on fruit diseases in the Ozark section of Missouri in 1937. U. S. Dept. Agr. Bur. Plant Indus. Plant Disease Reptr. 22: 12-13. 1938.

5/. Dunegan, John C. Notes on fruit diseases in the Ozark section of Arkansas in 1937. U. S. Dept. Agr. Bur. Plant Indus. Plant Disease Reptr. 22: 34-37. 1938.

TOBACCO DOWNY MILDEW SITUATION IN FLORIDA 1/

W. B. Tisdale and R. R. Kincaid

Downy mildew [Peronospora tabacina] was first found this season on five tobacco beds on February 9 and 10. The degree of infection indicated that the disease had been active in these beds for a week or more.

During the week of February 13 the disease began to appear in new land beds and by February 25 it had been observed in a total of 29 beds, 15 of which were on old bed sites and 14 on new land. Farmers reported that it was becoming very prevalent, but no attempt was made to check on the percentage of beds infected. The beds known to be infected were distributed among five of the principal tobacco-growing counties in the northern part of the State. Downy mildew was found in two other counties by the end of February, indicating that a general outbreak was imminent. The situation appeared to be complicated by the freezing temperatures which occurred throughout the tobacco-growing area of the State on February 23 and 24, causing some injury in most beds. In some beds the plants were nearly all killed. It has been estimated that the loss of plants from downy mildew and frost together was as high as 50 percent in certain counties. The cold injury made the presence of downy mildew more difficult to detect in many instances. There is still an ample supply of plants and the final outcome will be determined by the weather conditions from now on.

(Florida Agricultural Experiment Station).

POSSIBLE CAUSE OF BLACK KERNELS IN RICE

Alan L. Martin

A new disease of rice, Oryza sativa L., characterized by the presence of a small percentage of jet black grains in the polished product, has appeared recently in the United States. The affected kernels cannot be seen prior to milling. Consequently, considerable expense may be involved in removing these black grains before marketing. The disease has been most prevalent on the Fortuna and Rexoro varieties, although practically all commercial varieties are susceptible.

Cultural isolations from approximately 1200 black kernels, previously sterilized externally with 1:1000 mercuric chloride solution, consisted of several different fungi. In keeping with the results of certain

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1/. See page 88 for tobacco downy mildew in North Carolina.

previous work[1/], [2/] Curvularia lunata[3/] was the fungus most frequently obtained in culture. Occasionally, growth of Helminthosporium oryzae, Fusarium sp., Trichoconis caudata, and Basisporium gallarum [Nigrospora] also was obtained.

In field experiments dusting of rice plants during the flowering stage with pulverized black rice kernels resulted in 23 percent discolored kernels in the mature grains. Inoculation by dipping blooming heads of rice into an aqueous suspension of Curvularia spores produced 10.7 percent of black kernels. After harvesting, seeds from these inoculated heads were incubated in a moist chamber at 35° C for two weeks and the number of black kernels was increased by this treatment to 12.9 percent of the total grains. Although several organisms which were neither pathogenic nor of the discoloring type grew over many of the seeds, Curvularia lunata showed up in 67 cases out of 210 when black grains obtained by these treatments were cultured. Inoculation of rice seeds or seedlings with cultures of fungi isolated from discolored kernels did not produce black-kernel symptoms.

These studies indicate that Curvularia lunata may be the causal organism of the black-kernel disease of rice.

(Substation No. 4, Texas Agricultural Experiment Station).

ADVERSE WEATHER BRINGS MOST LOSS TO WHEAT CROP

(U. S. Dept. Agr. Press Release. March 5.)

Although the nation's wheat crop faces many hazards each season, including insect pests, plant diseases, and fire, the greatest cause of loss is adverse weather conditions, according to the Federal Crop Insurance Corporation, a new Department of Agriculture agency offering "all-risk" crop insurance policies to wheat growers.

The Corporation's findings indicate that bad weather--drought, too much rain, hail, hot winds, storms, cold waves--is responsible for about 73 percent of all wheat crop losses. Droughts alone account for about 38 percent of total wheat crop losses and thus are the major hazard facing

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1/. Tullis, E. C. Fungi isolated from discolored rice kernels. U. S. Dept. Agr. Tech. Bull. 540. 1936.

2/. Taubenhaus, J. J., G. E. Altstatt, and R. H. Wyche. Black kernel of rice. In Texas Agr. Expt. Sta. Ann. Rpt. 48: 94. 1935.

3/. Boedijn, K. B. Ueber einige Phragmosporen Dematiazeen. Bull. Jard. Bot. Buitenzorg, III Serie, 13(1): [120]-134. 1933.

wheat growers. Other weather losses and approximate percent of total damage attributable to them: Freezes, 14 percent; too much rain, 8 percent; storms and hot winds, 7 percent; hail, 4 percent; floods, 1 percent; and other weather, 1 percent.

Insect pests were rated as causing about 9 percent of total crop damage and plant diseases were charged with 17 percent.

More than 112,000 wheat growers have insured themselves against unavoidable losses in 1939 by taking out crop insurance policies which guarantee them up to 75 percent of their average yield.

DISEASES OF SHADE AND ORNAMENTAL TREES: SUMMARY OF SPECIMENS RECEIVED IN 1938 AT THE NEW HAVEN OFFICE, DIVISION OF FOREST PATHOLOGY

Alma M. Waterman

ACER

Anthracnose (Gloeosporium apocryptum). New Hampshire.
Leaf spot (Phyllosticta minima). New York, Tennessee.
Tar spot (Rhytisma acerinum). Iowa.
Wilt (Verticillium sp.). Maine, Vermont, Virginia.

ALBIZZIA JULIBRISSIN

Canker (Nectria cinnabarina). North Carolina.

BETULA

Canker (Cytospora chrysosperma). New York.

CELTIS

Downy mildew (Pseudoperonospora celtidis). Georgia.
Powdery mildew (Sphaerotheca phytoptophila). Tennessee.

CERCIS CANADENSIS

Canker (Botryosphaeria sp.). Delaware, District of Columbia, Maryland.

CORNUS

Root rot (Armillaria sp.). New York.
Canker (Botryosphaeria sp.). Pennsylvania.
Leaf spot (Phyllosticta corni). North Carolina.
Leaf spot (Septoria cornicola). Virginia.

COTINUS

Wilt (Verticillium sp.). Connecticut.

CRATAEGUS

Leaf spot (Entomosporium thuemenii). Michigan, New York.
Rust (Gymnosporangium clavipes). Connecticut.
Canker (Sphaeropsis sp.). Connecticut, Wisconsin.

FAGUS

Die-back (Phomopsis sp.). New York.

FRAXINUS

Leaf spot (Marssonia fraxini). Indiana.
Canker (Cytospora sp.). Indiana, Wisconsin.

GLEDITSIA TRIACANTHOS

Canker (Dothiorella sp.). Mississippi.

ILEX

Die-back (Phomopsis sp.). New Jersey.

JUGLANS

Leaf spot (Marssonia juglandis). New York, Wisconsin.

LIQUIDAMBAR STYRACIFLUA

Canker (Botryosphaeria sp.). Georgia.
Canker (Nectria sp.). Georgia.

LIRIODENDRON TULIPIFERA

Canker (Dothiorella sp.). Pennsylvania.

PICEA

Canker (Cytospora kunzei). Delaware.
Rust (Melampsoropsis ledicola). Idaho on P. engelmanni; Wisconsin.
Leaf cast (Rhizosphaera sp.). Connecticut, New York, on P. pungens.

PINUS

Canker (Caliciopsis pinea). North Carolina, Virginia, on P. strobus.
Needle cast (Lophodermium pinastri). Oregon on P. ponderosa; South Carolina.
Leaf spot (Septoria spadicea). New Hampshire, Vermont, on P. strobus.
Tip blight (Sphaeropsis ellisi). Connecticut, Iowa, Ohio, Pennsylvania, Wisconsin, on P. nigra; Pennsylvania, Wisconsin, on P. sylvestris; New York on P. ponderosa.

PLATANUS

Anthracnose (Gnomonia veneta). Missouri on P. occidentalis; Illinois on P. orientalis.
Powdery mildew (Microsphaera alni). New Jersey, New York, on P. orientalis.

POPULUS

Leaf spot (Marssonia sp.). South Carolina.

QUERCUS

Rust (Cronartium cerebrum). Georgia on Q. virginiana: South Carolina.
Twig blight (Diplodia longispora). Iowa, Massachusetts, Virginia, West Virginia.
Anthracnose (Gnomonia veneta). Connecticut, Massachusetts, New York, Pennsylvania, Virginia, Wisconsin.
Leaf blister (Taphrina coerulescens). Alabama, Georgia, New York, North Carolina, Virginia.
Rot (Ustulina sp.). Iowa, Missouri.

SALIX

Leaf spot (Gloeosporium salicis). Vermont.
Leaf spot (Marssonia salicicola). Maryland.

TSUGA

Canker (Cytospora sp.). Maryland.

ULMUS

Canker (Cytospora sp.). Rhode Island.
Black leaf spot (Gnomonia ulmea). Illinois, New Hampshire, New York, Massachusetts, Missouri, Ohio, Tennessee.
Canker (Phomopsis oblonga). Rhode Island.
Canker (Sphaeropsis sp.). District of Columbia, Wisconsin.
Mildew (Uncinula macrospora). Georgia.
Wilt (Verticillium sp.). New York.

(Division of Forest Pathology, Bureau of Plant Industry, U. S. Dept. of Agriculture, in cooperation with Osborn Botanical Laboratory, Yale University, New Haven, Connecticut).

BRIEF NOTES ON PLANT DISEASES

LOSSES FROM CORN EAR ROTS IN ILLINOIS: In continuing the corn ear rot determinations on the Agronomy South Farm at Urbana, in which I am trying to measure losses from rot rather than prevalence, uniformly at a given location on a considerable quantity of corn, I find the rots for 1938 the lowest recorded so far. The data for 1937 also were exceptionally low, but the relative importance of Fusarium and Diplodia rot was reversed.

Year	Diplodia zeae	Fusarium moniliforme	Nigrospora sp.	Gibberella zeae	Total
	perct.	perct.	perct.	perct.	perct.
1937	.18	3.10	.09	.0	3.37
1938	1.85	.63	.09	.10	2.67

(Benjamin Koehler, University of Illinois).

THIELAVIOPSIS BASICOLA (BERK.) FERRARIS ON GERANIUM IN CONNECTICUT: Two cases of Thielaviopsis basicola on geranium (Pelargonium sp.) have been received. The first specimens, received in August, 1938, were grown in the open in a cemetery in Hartford. For at least six years the caretaker of the cemetery has grown all his plants from his own cuttings. The specimens of the second case, received in February, 1939, were young plants from a greenhouse in Hartford. From both lots the fungus has been isolated and the one from the cemetery has given positive results in inoculation. No record has been found of this fungus growing on geranium. (Florence A. McCormick, March 4, Connecticut Agricultural Experiment Station, New Haven).

TOBACCO DOWNY MILDEW IN NORTH CAROLINA: Downy mildew, caused by Peronospora tabacina, was first found in North Carolina this season on March 8 on tobacco seedlings in a plant bed on an old site near Lumberton. The disease had apparently been macroscopically evident on the plants for three to four days prior to March 8. During the period from March 8 to March 13 the disease definitely appeared in a few widely scattered beds on old sites in Robeson County. Evidence of secondary spread was not found in a survey of several beds in this County on March 13. (O. P. Owens, Luther Shaw, and W. D. Reynolds, North Carolina State College of Agriculture).

FEBRUARY UNUSUALLY WET--COLD IN WEST

The weather during February 1939 was, in several respects, in marked contrast to conditions that had prevailed during the preceding winter months, which had been abnormally mild in practically all sections of the country. Early February brought the beginning of a series of dense, cold, polar-air masses into the western United States, and the persistent mild weather gave way to abnormally low temperatures. This condition obtained through practically the entire month, with almost continuous low temperatures in the Northwestern and Western States. East of the Mississippi River, while there were a few sharp, short-lived cold spells, the weather in general continued much warmer than normal. Thus the Eastern States had a mild month and the West unusually low temperatures. (See Fig. 1).

Also, in contrast with the early part of the winter, February brought abnormally heavy precipitation nearly everywhere from the Rocky Mountains eastward. (See Fig. 2). A considerable area in the Southwest, including mostly western Texas, eastern New Mexico, and parts of Oklahoma, and also Florida, had a shortage of precipitation, parts of Florida and parts of Texas were especially dry. Elsewhere, a great majority of stations, in fact nearly all of them, reported precipitation far above normal with many having monthly totals more than twice the normal.

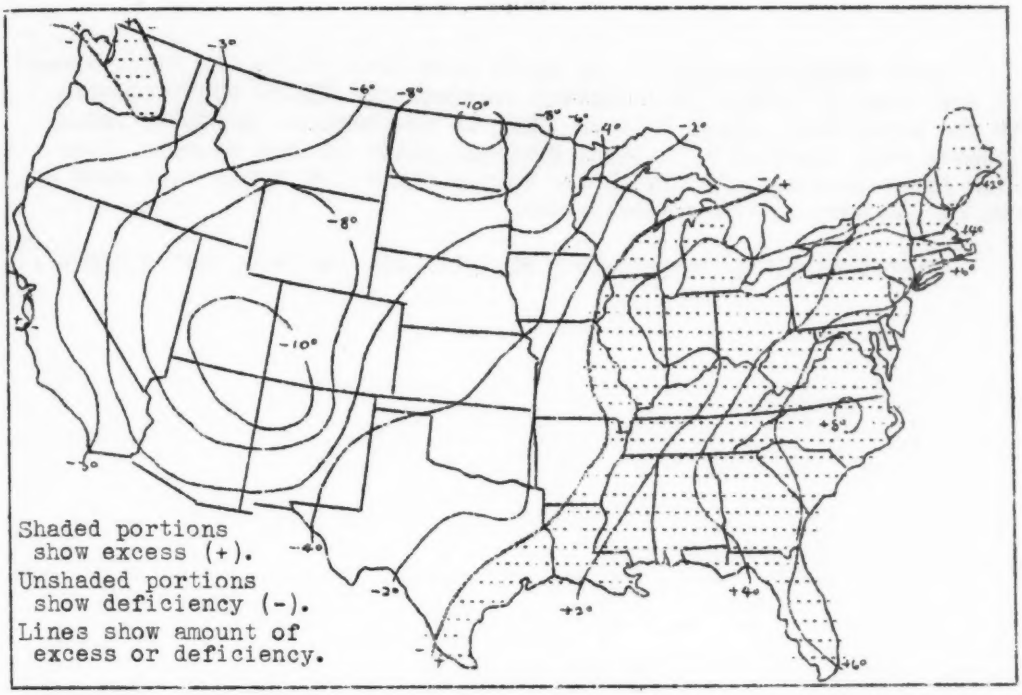

Fig. 1. Departure of Mean Temperature from the Normal for February 1939.

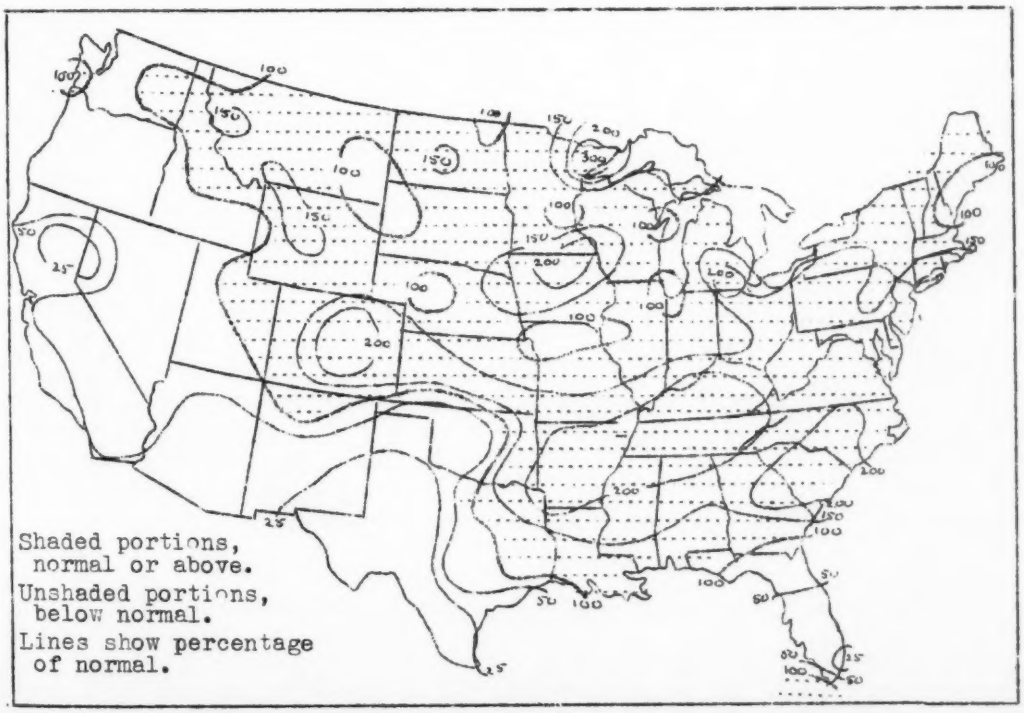

Fig. 2. Percentage of Normal Precipitation for February 1939.

Heavy snows occurred in the Rocky Mountains, while the month closed with deep snow in a belt from eastern Colorado and Kansas northeastward over the upper Mississippi Valley. Some of the heaviest February snows of record were reported with high, drifting winds in many places. West of the Rocky Mountains the month was mostly drier than usual with some areas having very little precipitation.

(From Weekly Weather and Crop Bulletin for the week ending March 7).